	Type	L #	Hits	Search Text	DBs	Time Stamp
1	BRS	L1	25	transparent adj3 dielectric adj3 matrix	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 15:48
2	BRS	L2	195388	(silica or alumina or hydrosilsesequioxane or polyimide or epoxy or polymethylmethacrylat or PMMA or (methyl adj silsesquioxane)) same (cobalt or Co or nickel or Ni or oxide or "Fe.sub.2O.sub.3" or (chromium adj oxide) or "CrO.sub.2" or (europium adj oxide) or EuO or (NiZn adj ferrite) or (MnZn adj ferrite) or (Yittrium adj iron adj garnet))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:11
3	BRS	L3	0	(distribute or distributed or distributing or deposit or deposited or depositing) adj10 (nano adj3 magentic adj3 particles) adj10 (dielectric)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:11
4	BRS	L4	875	(magnetic adj3 particles) same spherical	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:11

	Type	L #	Hits	Search Text	DBs	Time Stamp
5	BRS	L5	372	((magnetic adj3 particles) same spherical) and (silica or alumina or (aluminum adj oxide) or hydrosilsesquioxane)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:11
6	BRS	L20	3993	matrix same (polyimide or PMMA or methylsilsesquioxane)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:17
7	BRS	L22	0	(matrix same (polyimide or PMMA or methylsilsesquioxane)) same diamagnetic	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:17
8	BRS	L27	1080	matrix adj10 (polyimide or PMMA or methylsilsesquioxane)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:18

	Type	L #	Hits	Search Text	DBs	Time Stamp
9	BRS	L6	7	((silica or alumina or hydrosilsesequioxane or polyimide or epoxy or polymethylmethacrylat or PMMA or (methyl adj silsesquioxane)) same (cobalt or Co or nickel or Ni or oxide or "Fe.sub.2O.sub.3" or (chromium adj oxide) or "CrO.sub.2" or (europium adj oxide) or EuO or (NiZn adj ferrite) or (MnZn adj ferrite) or (Yittrium adj iron adj garnet))) same (diamagnetic)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
10	BRS	L7	151	((silica or alumina or hydrosilsesequioxane or polyimide or epoxy or polymethylmethacrylat or PMMA or (methyl adj silsesquioxane)) same (cobalt or Co or nickel or Ni or oxide or "Fe.sub.2O.sub.3" or (chromium adj oxide) or "CrO.sub.2" or (europium adj oxide) or EuO or (NiZn adj ferrite) or (MnZn adj ferrite) or (Yittrium adj iron adj garnet))) and superparamagnetic	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
11	BRS	L8	1	(distribute or distributed or distributing or deposit or deposited or depositing) same (nano adj3 magnetic adj3 particles) same (dielectric)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
12	BRS	L9	44	(distribute or distributed or distributing or deposit or deposited or depositing) same (magnetic adj3 particles) same (dielectric)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30

	Type	L #	Hits	Search Text	DBs	Time Stamp
13	BRS	L10	337	(distribute or distributed or distributing or deposit or deposited or depositing or mix or mixture or laminate or laminated or laminating) same (magnetic adj3 particles) same (dielectric or dielectrics or insulate or insulated or insulating or encapsulate or encapsulating or encapsulated)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
14	BRS	L11	12	((distribute or distributed or distributing or deposit or deposited or depositing or mix or mixture or laminate or laminated or laminating) same (magnetic adj3 particles) same (dielectric or dielectrics or insulate or insulated or insulating or encapsulate or encapsulating or encapsulated)) same (silica or alumina or hydrosilsesquioxane)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
15	BRS	L12	11	(insulator same (composit$3) same (magnetic adj3 particles))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
16	BRS	L13	57	composit$3 same dielectric same (magnetic adj3 particles)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30

	Type	L #	Hits	Search Text	DBs	Time Stamp
17	BRS	L14	8	(spherical adj3 magnetic adj3 particles) same ((non adj3 spherical) or ellipsoids or needle or plate or tetrahedral) adj3 magnetic adj3 particles	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
18	BRS	L15	352	(((magnetic adj3 particles) same spherical) and (silica or alumina or (aluminum adj oxide) or hydrosilsesquioxane)) and (indium or In)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
19	BRS	L16	25	(add or adding or added) same (spherical adj3 magnetic adj3 particles)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
20	BRS	L17	52	diamagnetic same superparamagnetic	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
21	BRS	L18	10	(diamagnetic same superparamagnetic) same (indium or In)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30

	Type	L #	Hits	Search Text	DBs	Time Stamp
22	BRS	L19	16	(diamagnetic) and (mixture same superparamagnetic)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:30
23	BRS	L21	164	(matrix same (polyimide or PMMA or methylsilsesquioxane)) same indium	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
24	BRS	L23	17	diamagnetic same indium	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
25	BRS	L24	4	(magnetic adj3 particles) adj10 indium	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
26	BRS	L25	40	(magnetic adj3 particles) same (non adj3 spherical)	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
27	IS&R	L26	1	("6232777").PN.	USPAT	2002/10/18 16:31

	Type	L #	Hits	Search Text	DBs	Time Stamp
28	BRS	L28	6	(matrix adj10 (polyimide or PMMA or methylsilsesquioxane)) same ((chronium adj3 oxide) or (europium adj3 oxide) or ferrite or (ytrium adj3 iron adj3 garnet))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
29	BRS	L29	9	(matrix adj10 (polyimide or PMMA or methylsilsesquioxane)) and ((chronium adj3 oxide) or (europium adj3 oxide) or ferrite or (ytrium adj3 iron adj3 garnet))	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
30	BRS	L30	2	(diamagnetic same add$6 same paramagnetic) same indium	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
31	BRS	L31	107	diamagnetic same add$6 same paramagnetic	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
32	BRS	L32	5	(diamagnetic same add$6 same paramagnetic) and indium	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31

	Type	L #	Hits	Search Text	DBs	Time Stamp
33	BRS	L33	3	(diamagnetic same (combine or combined or combination or composite or composition or compositing) same paramagnetic) same indium	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
34	BRS	L34	170	diamagnetic same (combine or combined or combination or composite or composition or compositing) same paramagnetic	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
35	BRS	L35	6	(diamagnetic same (combine or combined or combination or composite or composition or compositing) same paramagnetic) and indium	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31
36	BRS	L36	29	(magnetic adj3 particles) same non-spherical	USPAT; US-PGPUB; EPO; JPO; DERWENT; IBM_TDB	2002/10/18 16:31

by using **non-spherical magnetic particles,** it becomes possible to increase the filling quantity of the **magnetic particles** in a magnetic molded article due to reduced gaps between individual **magnetic particles,** to improve the electromagnetic characteristics.

In addition, since the surface area per **non-spherical** magnetic particle is larger than that of an almost spherical particle, the force with which it adheres to the resin increases, and thus, there is another advantage that we may expect in that the bonding strength between the **magnetic particles** and the resin increases.

It is desirable that the **magnetic particles** be constituted of a plurality of types of particles having different particle diameters, all of which are commonly coated with resin. In this case, as long as at least one of the plurality of types of **magnetic particles is non-spherical,** the other types of **magnetic particles** may be either spherical or **non-spherical**. In other words, combinations in which all the **magnetic particles** are spherical must be excluded. The particle diameter of a magnetic particle may be defined as the maximum diameter of the particle.

If, among the resin-coated **magnetic particles,** those particles having large particle diameters are formed in a **non-spherical** shape, the gaps formed between the **magnetic particles** with the large particle diameters can be filled with **magnetic particles** having small particle diameters that are formed in spherical or **non-spherical** shapes. Thus, when a magnetic molded article constituted of such resin-coated **magnetic particles** is formed, the weight of the **magnetic particles** relative to the entire volume of the resin-coated

magnetic particles can be further increased, thereby making it possible to assure even better electromagnetic characteristics.

If magnetic particles with a large particle diameter are formed in a spherical shape, too, the area surrounding these magnetic particles will be filled by magnetic particles with small particle diameters formed in non-spherical shapes, thereby further increasing the weight of the magnetic particles relative to the entire volume of the resin-coated magnetic particles in a magnetic molded article, to assure further improvement in the electromagnetic characteristics.

Since a resin coating film is formed on the surfaces of non-spherical magnetic particles in the magnetic powder according to the present invention, a magnetic molded article containing a great quantity of magnetic particles can be achieved by filling the magnetic powder into a metal mold and applying heat and pressure to cause the resin to melt and harden. The molding itself is implemented by filling the magnetic powder in a mold that can be heated to the temperature at which the coated resin becomes soft or to the temperature at which the softening starts and applying heat and pressure.

In FIG. 1, a resin-coated magnetic particle includes a non-spherical magnetic particle A which is thinly coated with resin C. The magnetic powder according to the present invention is an aggregation of the magnetic particles A, one of which is shown in FIG. 1. The non-spherical magnetic particles A may be obtained in the form of pulverized ferrite pieces. The maximum value for the particle diameter D1 of the magnetic particles A is determined in

correspondence to the thickness of the magnetic molded article. For instance, if the minimum thickness of the magnetic molded article is 5000 .mu.m, the maximum particle diameter D1 of the **magnetic particles** A is 5000 .mu.m.

When a magnetic molded article is formed by magnetic powder that contains a great number of **non-spherical magnetic particles** A as shown in FIG. 1, a phenomenon in which a projecting portion of another magnetic particle A fits in an indented portion of a magnetic particle A occurs, thereby reducing the gaps between the **magnetic particles**. Thus, the filling quantity of the **magnetic particles** A can be increased to improve the electromagnetic characteristics.

Next, in FIG. 2, the combined resin-coated **magnetic particles** are constituted of a first magnetic particle A having a particle diameter D1 and second **magnetic particles** B having a particle diameter D2, with the first magnetic particle A and the second **magnetic particles** B commonly coated by resin C. Both the first magnetic particle A having the particle diameter D1 and the second **magnetic particles** B having the particle diameter D2 are formed in a **non-spherical** shape. The particle diameter D2 of the second **magnetic particles** B is much smaller than the particle diameter D1 of the first magnetic particle A. The particle diameters D1 and D2 of the first magnetic particle A and the second **magnetic particles** B are defined as the maximum diameters of the individual particles. It is desirable to set the maximum and minimum particle diameters of the first magnetic particle A at 5000 .mu.m and 355 .mu.m respectively. It is desirable to set the particle diameter D2 of the second **magnetic particles** B at less than 355 .mu.m if the particle

diameter D1 of the
first magnetic particle A is set as described above.

While both the first magnetic particle A and the second **magnetic particles** B
are formed in **non-spherical** shapes in FIG. 2, it is only required that at least
either the first **magnetic particles** A or the second **magnetic particles** B be
non-spherical. In other words, the first **magnetic particles** A may be formed in
a spherical shape with the second **magnetic particles** B formed in **non-spherical**
shapes, or the first **magnetic particles** A may be formed in **non-spherical** shapes
with the second **magnetic particles** B formed in a spherical shape.

Since the advantages of the present invention are achieved by forming **magnetic**
particles in non-spherical shapes, they can be achieved in the same manner even
with different types of **magnetic particles**. In other words, the **magnetic**
particles according to the present invention may be constituted of either a
magnetic oxide material or a metallic magnetic material. A typical example of
a magnetic oxide material is ferrite, which includes Mn group soft ferrites, Mg
group soft ferrites and Ni group soft ferrites. These magnetic ferrite
materials may contain various additives.

Since the group of first **magnetic particles** A and the group of second **magnetic**
particles B are both constituted of the ferrite powder achieved through
pulverization, they are formed in **non-spherical** shapes (amorphous shapes).

In Table I, the volume weight index in test piece No. 12 (example for
comparison) achieved by coating the spherical **magnetic particles** constituted of
an Mn soft ferrite, with the resin being low, at 3.15, and consequently, a

sufficient degree of magnetic particle filling could not be achieved, resulting in a low initial magnetic permeability of 35. In contrast, the volume weight index in test piece No. 11 achieved by coating **non-spherical magnetic particles** constituted of pulverized pieces of an Mn soft ferrite with the resin being high, at 3.31, achieving an initial magnetic permeability of 40 and demonstrating a significant improvement in the electromagnetic characteristics over test piece No. 12.

The mixing ratios (weight ratios) in the group of first **magnetic particles** A and the group of second **magnetic particles** B obtained through a classification process similar to that employed in test example 1 were varied within the particle size distribution ranges given in reference to test example 1. Both the group of first **magnetic particles** A and the group of second **magnetic particles** B are constituted of pulverized pieces of Mn soft ferrite, and are **non-spherical**. The group of first **magnetic particles** A and the group of second **magnetic particles** B were mixed at a mixing ratio (weight ratio) A:B of 6:4. This mixed ferrite powder was then placed in a grinding mill and agitated for approximately 3 minutes with a styrene acrylic resin powder added. Thus, a magnetic powder achieved by coating the mixed ferrite powder with the styrene acrylic resin was obtained. The mixed ferrite powder and the styrene acrylic resin were mixed at a weight ratio of 10:1.

said resin-coated **magnetic particles** include **non-spherical magnetic particles** coated with said resin.

at least one of said plurality of types of **magnetic particles** is formed in a **non-spherical** shape and at least one of said plurality of

types of **magnetic**
particles is formed in a spherical shape.

among said plurality of types of **magnetic particles,**
magnetic particles having
a largest particle diameter are formed in a **non-spherical**
shape.

at least one of said plurality of types of **magnetic**
particles is formed in a
non-spherical shape and at least one of said plurality of
types of **magnetic**
particles is formed in a spherical shape.

among said plurality of types of **magnetic particles,**
magnetic particles having
a largest particle diameter are formed in a **non-spherical**
shape.

US-PAT-NO: 6063303

DOCUMENT-IDENTIFIER: US 6063303 A

TITLE: Magnetic powder and magnetic molded article

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The present invention relates to a magnetic powder that contains resin-coated **magnetic particles**. The resin-coated **magnetic particles** include **magnetic particles** A and B that are formed in **non-spherical** shapes, with the **magnetic particles** A and B coated with a resin C. The resin-coated **magnetic particles** make it possible to increase the filling quantity of the **magnetic particles** A and B when the magnetic powder is employed to constitute a magnetic molded article, to ultimately improve the electromagnetic characteristics of the magnetic molded article.

In order to achieve the object described above, the magnetic powder according to the present invention is constituted of an aggregation of resin-coated **magnetic particles**. The resin-coated **magnetic particles** include **non-spherical** **magnetic particles** which are coated with resin. According to the present invention, the term "**non-spherical**" covers a large variety of shapes including scale shapes, flat shapes, shapes with a portion of a sphere or ovoid missing, and shapes with indentations and projections formed on the surface.

The inventor of the present invention has conducted extensive research to address the problem of the prior art discussed above, and has discovered that

US-PAT-NO: 6113746

DOCUMENT-IDENTIFIER: US 6113746 A

TITLE: Methods for altering the magnetic properties of materials and the
materials produced by these methods

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The subject process can be applied to, for example, **diamagnetic,** paramagnetic,
and ferromagnetic materials. The magnetic properties of **diamagnetic** materials
such as silicon, silicon oxides, germanium, arsenic, selenium, gallium
arsenide, gallium phosphide, and other alloys can be altered using the subject
method. The magnetic properties of paramagnetic materials such as chromium,
copper, zinc, gold, silver, niobium, molybdenum, tungsten, platinum, tin,
indium, and alloys containing these and other elements can also be altered
using the subject processing techniques. The subject process can also be
applied to ferromagnetic iron alloys and alloys of cobalt and nickel.

US-PAT-NO: 5582172

DOCUMENT-IDENTIFIER: US 5582172 A

TITLE: System of drug delivery to the lymphatic tissues

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36. A composition of claim 28, wherein said **diamagnetic** particle comprises **indium**.